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COTTON INSECTS

Thurberia weevil increases alarmingly.-T. P. Cassidy, Tucson, Ariz., reports an alarming increase and spread of the *Thurberia weevil* (*Anthonomus grandis thurberiae* Pierce). Referring to February examinations in the Tucson district, he says an examination of 14,610 bolls showed that 653 of these, or 4.5 per cent, contained weevils or weevil cells, and that weevils were found in every field inspected. The percentage of boll infestation was from 0.6 per cent to 15.2 per cent, the highest infestation found in this district since 1925, when the Bureau began keeping records. The significant spread noted was the finding of an 0.08 per cent boll infestation in the Eloy district, based on examinations of approximately 9,000 bolls. The importance of this finding is that the district in question is intermediate between the Tucson area and the Salt River Valley.

Bucculatrix thurberiella Busck survives winter as adults.-Following the unusually low temperature of 10° F., in January, Mr. Cassidy collected at Tucson, in field-cotton debris, several living moths of the cotton leaf perforator, which became active under indoor temperatures, thus indicating that the unusual cold had not hurt them much. This is important confirmation of previous indefinite records on the longevity of moths during the winter months. Evidence obtained by T. C. Barber at Brownsville, Tex., shows that the development of this species "is continuous, though slow, during moderate winters in that section."

Abundant winter activity of *Anthonomus grandis* Boh.-Reports received from T. C. Barber, Brownsville, Tex., and A. G. Maloney, Tallulah, La., indicate unmistakably that the boll weevil remained active in the fields through the winter (up to February) in freshly sprouted and growing cotton that had remained alive since last fall. Near Orangeburg, S. C., on February 29, F. F. Bondy found 75 live weevils in a single field. This is believed to be the first record of this kind since the boll weevil reached South Carolina. Mr. Maloney observed that "in 50 counties extending from the lower Rio Grande in Texas (northeastward across the State) to Ellis County * * * cotton stalks kept on growing (up to February) * * * and in some sections plants are blooming or developing squares. * * * These volunteer cotton plants are now hosts to numerous weevils in various stages." Mature weevils were active in southern Texas generally and some of the immature weevils of last fall had survived and matured,

owing to the prevailing mild weather. Mr. Maloney quotes W. E. Hinds as reporting the existence of a similar condition at Baton Rouge, La., the first occurrence of it there since 1924. In Mississippi conditions are quite similar, according to Mr. Maloney.

Pink bollworm emerges early.—Concerning the activity of Pectinophora gossypiella Saund., C. S. Rude, Tlahualilo, Dgo., Mex., says: "The first emergence was recorded on February 27, when two pink bollworm moths were taken; five others were taken on February 29."

INSECTS AFFECTING MAN AND ANIMALS

Gambusia patruelis (Baird & Girard) survives winter in new environment.—From December to February, inclusive, H. H. Stage and assistants investigated a newly established colony of this mosquito-destroying top minnow in a shallow pond on Hayden Island (near Portland, Oreg.), where 35 fish were first placed on October 11, 1930. The fish are known to be abundant in sluggish waters nearly everywhere south of the Ohio River. Mr. Stage reports that "Even though mortality (of the fish) has been high there still remains a good stock" here. Since the first stocking, none has been added and "at least 10,000 were taken from this pond before August 20, 1931, for stocking elsewhere. By estimate, some 3,000 to 5,000 were present on February 24 or about one-third the number" * * * present August 20, 1931. In other localities where it has been introduced this fish has reproduced in fair numbers. "But the results have not been so encouraging as on Hayden Island. It is hoped that from those that have withstood a rather severe winter, a strain may be developed that can adjust itself to this climate. Last fall, 300 were taken to Lane County for stocking ponds producing anopheline mosquitoes. It is proposed to stock all permanent waters in this vicinity with Gambusia patruelis (= G. affinis) if a strain can be developed that will succeed here."

Mosquitoes troublesome in Florida.—T. E. McNeel, Orlando, Fla., says: "Culex quinquefasciatus Say (the rain-barrel mosquito) and Aedes aegypti L. (the yellow-fever mosquito) were found (in February) breeding in many places over the country. * * * Very few adult Mansonia sp. have been taken. The larvae of this species are found to be plentiful in the marshes. Nearly all of the larvae are full grown."

Sand flies annoy mules.—W. E. Dove reports that "At Charleston, S. C., mules used in cultivating land are severely bitten by sand flies. The bites of the flies apparently cause itching and result in rubbing and biting by the animals. Some of the mules have removed hair from so many places that they have the appearance of a "flea bitten" horse. When one of the affected mules was sent to the high country there was a prompt improvement. In scrapings of the skin we have been unable to find any mange."

Burning effective against sand flies.—Frank M. Prince, Charleston, reporting on treatments for sand fly larvae, says: "Burning with distil-

late oil gave a destruction of practically all sand fly larvae in a small area treated in this manner. Five quarts of soil obtained from this area just after the treatment furnished 7 larvae. Since then we have been unable to recover any larvae from this area. The observations suggest that besides the heat * * * there may be a condition resulting from the burning which also kills sand fly larvae."

Screw-worm fly most harmful to cattle.-A study was made at Menard, Tex., according to E. W. Laake, to determine the species of flies attacking livestock and to learn whether parasitism of fly larvae occurs in domestic animals. No parasite was reared from "the 11,865 larvae collected from wounds of domestic animals infested in nature. Of these larvae, 6,168 were fully developed and dropped normally from the host, while 5,967 last-instar larvae, medium to fully developed, were mechanically removed from the wounds; 87.87 per cent of the former and 66.53 per cent of the latter produced adults. The species of flies represented and the number of each produced were as follows: Cochliomyia macellaria Fab., 9,210, or 99.82 per cent; Phormia regina Meig., 15, or 0.16 per cent; and Sarcophaga species 2, or 0.02 per cent. From a series of 10 status jars baited with meat and exposed at the same time and in the pens with the infested animals, more than 2,000 blowfly larvae were collected. Of these 1,643 developed to adults, as follows: C. macellaria, 1,001; Lucilia unicolor Towns., 125; 336 Sarcophaga of four species, and 191 developed parasites, all of which were Brachymeria fonscolombei Duf. The pupae from which the parasites emerged were all of Sarcophaga. These results plainly substantiate our previous contention that the screw worm fly larvae, responsible for nearly all cases of myiasis in domestic animals throughout the Southwest, are not being attacked by the parasite B. fonscolombei, either in the wounds of infested animals or in status jars."

STORED PRODUCT INSECTS

Tobacco moth in foreign trade.-W. D. Reed, Richmond, Va., states that * * * it is "reported that a recent shipment of tobacco to London had been rejected on account of living (tobacco moth) Ephestia elutella Hbn. larvae in the hogsheds. This is the first shipment * * * rejected since our fumigation experiments last summer."

Tobacco beetle prefers peanut meal.-In regard to rearing stocks of Lasioderma serricorne Fab., Mr. Reed says: "* * * of 35 foods of the tobacco beetle assembled in order to determine the best food in which to maintain a rearing stock protected from parasites, peanut meal apparently has the greatest attraction for the beetles, and fish meal is second of the foods tested."

Moth-proofing agents and fumigants.-Wallace Colman, Silver Spring, Md., says: "Tests with borneol, terpineol, and fenchyl alcohol as moth-proofing agents and as fumigants gave entirely negative results. Apparently they have no value for use against clothes moth larvae."

Paradichlorobenzene effective against rice weevil.--Additional data on the effectiveness of paradichlorobenzene as a fumigant for the rice weevil (Sitophilus oryzae L.) is submitted by G. W. Ellington of Sligo, Md.: A 150-pound sack of wheat heavily infested with weevil adults and slightly infested with larvae of the cadelle (Tenebroides mauritanicus L.) was fumigated in a tight vault of 500 cubic feet capacity at a constant temperature of 80°F. It was left there for 15 days, but records were kept for only 5 days. Four pounds of the fumigant per 1,000 cubic feet were used, spread over papers distributed within the vault. The dosage used is about 7 times that known to give 100 per cent saturation for the space and temperature mentioned. The percentages of kill obtained follow: Sitophilus, after 1 day, 30 per cent; after 2 days, 90 per cent; after 3, 4, and 5 days, respectively, 100 per cent; cadelle larvae, after 1 and 2 days, respectively, none killed; after 3 days, 20 per cent; after 4 days, 88 per cent; after 5 days, 100 per cent.

Bean weevil infestation gains.--C. K. Fisher, of the bean weevil investigations, Modesto, Calif., reports results of the examination of warehouse samples in 1931. It is interesting to compare the number of samples showing infestation for the 1931 crop, 72.26 per cent, with those for 1930, 1929, and 1928, which were 32.21 per cent, 51.86 per cent, and 67.45 per cent, respectively. The increase in infestation in 1931 is 40.05 per cent over that in 1930.

Pea weevil controlled by burning.--A. O. Larson, Corvallis, Oreg., says: "During the month (February) we have made examinations for pea weevils in fence posts and trees adjoining pea fields in five counties of western Oregon. * * * Fifteen fields were examined. The straw on the stubble of eight of these had been burned shortly after harvest last fall. * * * Half of one field had been burned and half had been left unburned. Six fields had not been burned. * * * there was a very marked difference between the numbers of weevils found near burned fields and the number found near unburned fields." Where fields had not been burned many weevils were found, whereas fields that had been burned showed few weevils or none. Mr. Larson did not have the opportunity to check the conditions of hibernation in the burned fields with conditions surrounding these fields, but states that "in this section burning the pea stubble immediately after harvest promises to hold down the pea weevil infestation."

Tom Brindley, Moscow, Idaho, reports as follows: "The mortality among pea weevils hibernating in fence posts increased to 54.8 per cent. This sample was collected on the day following one during which the temperature dropped to--80° F."

A useful improvement in vacuum fumigation.--Perez Simmons, Fresno, Calif., reports a device "described to us by two workers who have been in contact with attempts made by the California Almond Growers Exchange to secure satisfactory kills during cold weather in the two vacuum fumigators installed on the roof of the Sacramento plant of the Exchange. It is

said that the superintendent conceived the idea of circulating the mixture of air and "carboxide" (held at a 25-inch vacuum) through an electric fan heater outside of a vacuum tank. By means of a fan installed in the circulating system the entire charge is drawn from one end of the tank, passed through the heater, and returned to the other end of the tank every 2 minutes. Complete mortality of test insects is reported to have resulted after the new equipment was installed."

Ant causes short circuit.-D. E. Reed, while scouting for the Argentine ant in Florida, records the following interesting observation on one of our native ants, Cremastogaster ashmeadi Mayr, at Deland, Fla.: "This species was taken from beneath bark on telephone poles. It eats out the insulation between the wires, which permits water to enter during rain, thus causing a short circuit. Entire sections of wire have to be replaced very often. According to the reports by the telephone people, I think there is no doubt that this ant is the species causing the trouble."

TOXICOLOGY AND PHYSIOLOGY OF INSECTS

Rotenone promising fly poison.-Continuing their studies on the toxicity of rotenone to house flies, F. L. Campbell and W. N. Sullivan, Takoma Park, Md., have found that "Rotenone affects the leg muscles of flies before it affects the wing muscles. The hind legs appear to be affected first. * * * The hind legs have the appearance of being broken. This effect persists and recovery from it has not been observed. * * * Such flies are likely to die in a short time from starvation if not from the direct effects of the poison."

An experiment by Messrs. Campbell and Sullivan on the comparative effects of pyrethrins and rotenone on house flies gave the following results: "After 45 minutes 5 out of 50 rotenone-tested flies were on their backs, and at 8.15 p. m., about 4 hours later, the same number of flies were severely affected, whereas at the same time all the pyrethrin-treated flies had recovered. Those affected by the pyrethrins are stimulated into more violent and uncoordinated movements than are those poisoned by rotenone. * * * It may be concluded that against house flies the pyrethrins are more effective than rotenone in causing paralysis, and that rotenone is more effective than the pyrethrins in causing death."

Tests on the relative effect of rotenone and acetyl rotenone showed that "rotenone is more effective than acetyl rotenone. It is noteworthy that only a relatively small number of flies were moribund 48 hours after treatment with acetyl rotenone."

BEE CULTURE

Wax envelope improves bee candy.-Jas. I. Hambleton, Somerset, Md., reports: "A series of cages have just been completed for the shipment of

foreign queens. From some countries, and especially from some of the less experienced breeders, the losses in foreign queens are quite heavy. One of the evident reasons for this is the composition of the candy and the manner in which the cage is prepared for shipment. The candies usually become too dry and hard, or are the other extreme and become soft and sticky." Mr. Hambleton conducted an experiment "in which a series of different kinds of candies were coated by dipping them in melted beeswax. With the use of candy in this form it will be possible to send the candy long distances for the use of shippers of foreign queens, insuring perfectly fresh candy for the bees when they are placed in the cage at the beginning of the journey. A small hole is made through the wax at the beginning of the journey, giving the bees access to the food. The use of the wax coating also permits the bees to determine the necessary size of the opening into the candy, enlarging it only as the occasion demands, and the desiccation or unnecessary smearing caused by too large an opening is prevented."

Rare crystals in honey.-The subject of this note is a sample of dandelion honey received at the Somerset laboratory in February from R. G. Richmond, of the Colorado Experiment Station. Mr. Hambleton says that "upon examination at the Bee Culture Laboratory, the sample showed a most interesting phase of granulation. Anhydrous dextrose crystals instead of the usual dextrose hydrate crystals were found. Only once before to our knowledge has this type of dextrose crystal been found in honey, so the sample was taken to the Bureau of Standards where the findings were verified. Evidently the treatment the honey underwent had something to do with the formation of this type of crystallization."

Commercial honey not a source of American foulbrood.-A. P. Sturtevant, Laramie, Wyo., continued in February his study of the method of examining commercial honey for the presence of spores of Bacillus larvae White. He reports: "One lot of honey was inoculated with 5,000,000,000 (spores of Bacillus larvae) per cubic centimeter, and then diluted with honey in a manner similar to the method of making up a series of spore dilutions in water, each dilution being examined by the centrifuge-microscope method. By this method it was impossible to demonstrate the presence of spores in the dilutions theoretically containing less than 500,000 spores per cubic centimeter. A second series of 10 cubic-centimeter quantities of honey were inoculated with 1/10 cubic-centimeter quantities of water dilutions of spores, giving a series of samples of honey with spore content ranging from 5,000,000,000 down to 50 spores per cubic centimeter. Then after centrifuging, a stained smear of 1/100 cubic centimeter of the sediment of each sample was examined under the microscope and the spores present in 10 fields were counted. * * * A comparison of these results with the examination of commercial samples in which only a very few spores were found as a rule, even when 50 or more fields were examined, would indicate that such samples probably contain less than 50,000 per cubic centimeter, the minimum infectious dose producing disease."

FRUIT AND SHADE TREE INSECTS

H. E. Burke reports that on a trip from Palo Alto to Davis, Calif., by way of Martinez and returning through Antioch he observed a distinct difference in susceptibility between Monterey cypress and Italian cypress to the cypress twig borer (Phloeosinus cristatus Lec.). Most of the Monterey cypress was dead or dying, while the Italian cypress was in good condition.

Trichogramma active in winter.-Herbert Spencer and Luther Brown, of the Albany, Ga., laboratory, have made an effort to determine the manner in which Trichogramma minutum Riley passes the winter in southern pecan groves. Parasitized eggs of a lepidopterous insect were found in a pecan grove on January 21, and from these two Trichogramma adults emerged on February 8. * * * The stock of Trichogramma that has been kept out of doors in a screen cage with grain moth eggs since December 24 is now in the fourth generation, "approximately 5,000 adults having issued on January 14; 6,500 on February 8; and 18,000 on February 29. * * * This evidence strengthens our theory that Trichogramma minutum passes through the winter in southern Georgia by breeding in the eggs of lepidopterous hosts, rather than by hibernation. * * * The present warm winter with a minimum February temperature of only 33° F. (February 5), and with maxima above 80° F. on 5 days, should be especially favorable for the survival of Trichogramma."

Ceratitis capitata Wied. causes fruit drop.-Experiments made by C. B. Keck, of the Honolulu, Hawaii, laboratory, with screened and unscreened grapefruit and orange trees indicate that oviposition punctures made by the Mediterranean fruit fly serve as entrance places for pathogenic organisms that cause dropping of the fruits. * * * This may prove to be the most important injury produced by the presence of Mediterranean fruit flies in citrus groves. On September 20, 1931, a Duncan grapefruit tree and a Valencia orange tree were screened and fumigated to prevent fruit flies from puncturing the fruits. A tree of each variety adjacent to the caged trees was marked as a check tree. When the fruits began to ripen, which was about November 15, 1931, counts were made at weekly intervals of the drops beneath the screened and the unscreened trees." By February 23, 1932, all fruits had fallen from the unscreened trees, whereas there were still 91 fruits left on the screened Duncan grapefruit tree and 312 on the screened Valencia orange tree. (Small trees were used to save cost in screening.)

Parasites reared from the pecan case bearer.-C. B. Nickels, Brownwood, Tex., says: "A total of 4,621 larvae and pupae of the nut case bearer were collected in the field (in 1931) and reared in individual vials in the insectary. The following primary larval and pupal parasites emerged from this material: Angitia sp., Apanteles epinoliae Vier., Bassus acrobasidis Cush., Brachymeria hammari Cwfd., Calliephialtes grapholithae Cress., Hydnocera knausi Wickh., Macrocentrus sp., Microbracon variabilis Prov., Nemorilla maculosa Meig., Orgilus maculiventris Cress., Perisierola cellularia var. punctaticeps Kieffer, Pristomerus

agilis Cress., Secodella subopaca Gahan, Secodella n. sp., Amblyteles sp. possibly soror Cress., Cremastus n. sp., and Nemorilla floralis Fall. The last three species of parasites were not bred from the nut case bearer at this laboratory prior to 1931. Trichogramma minutum Riley was the only parasite reared from the egg of the nut case bearer."

Winter applications of oil emulsions cause injury.-Experiments by Oliver I. Snapp and J. R. Thomson, Fort Valley, Ga., to determine the cumulative effect from the use of different concentrations of lubricating-oil emulsions on peach trees are reported by them- "The peach trees that were sprayed with lubricating-oil emulsion at different strengths on January 20 showed the following conditions on February 29: Three per cent and 6 per cent emulsions, no injury; 8 per cent emulsion, considerable injury to twigs; 12 per cent emulsion, considerable injury to twigs; 15 and 25 per cent emulsions, severe injury to twigs. This is the first year injury to peach trees from an 8 per cent lubricating-oil emulsion was observed. This may be due to the abnormally high temperatures prevailing since the sprays were applied. The maximum temperatures on the second, third, and fourth days after spraying were 74.5, 75.3, and 76.1 degrees, respectively, and three weeks after spraying the maximum was 81 degrees. This is the fourth consecutive annual application of the 10 per cent emulsion and the third consecutive annual application of the 3, 6, 8, 12, and 15 per cent emulsions."

A new use for worn-out motor oils.-Messrs. Snapp and Thomson have found that "A fairly stable emulsion of worn-out oil from the crank case of automobiles was produced by the use of an excess of a nonsoap emulsifier. On February 20 counts of San Jose scale (Aspidiotus perniciosus Comst.) were made on the trees which were sprayed on January 20 with a 4 per cent emulsion of worn-out crank case oil." The average percentage of scale alive before spraying was 88.2 ± 2.19 and one month after spraying with 4 per cent emulsion of worn-out crank-case oil, it was 2.0 ± 1.0 , whereas in the checks the percentages were 88.7 ± 0.49 alive on January 20 and 86.5 ± 0.4 alive one month later, the average percentage of control with the spray being 97.6 ± 1.1 . "These results indicate that worn-out oil from the crank-case of automobiles will give very good control of the San Jose scale when used at 4 per cent strength, provided the oil is completely emulsified and the emulsion is fairly stable."

Winter mortality of codling moth.-A. J. Ackerman and S. A. Summerland report that "Examinations for mortality of overwintered codling moth larvae kept in the insectary breeding shelter at Bentonville (Ark.) during the winter of 1931-32 were made late in February. In a supply of over 11,000 worms in pupae sticks only 9 per cent were found dead." Winter mortality of worms under bands in check orchards at Bentonville and at Springdale was less than 10 per cent. "From a collection of about 1,200 worms taken under bands in a Springdale orchard on March 1, 4 pupae were observed * * * probably the earliest record of codling moth pupation for this orchard section. Twelve degrees above zero was the minimum temperature recorded at Bentonville during the past winter * * *"

Survival of fruit-fly larvae in ocean.—Concerning the advisability of dumping waste or rotten fruits infested with the Mediterranean fruit fly into the ocean for destruction of the fly larvae, R. H. Marlowe and Tai Hee Hong, Honolulu, T. H., have observed that "In four experiments with infested kamani nuts and two experiments with infested Mediterranean sweet orange, the fruits after floating 48 hours in sea water will yield larvae, while 72 hours was necessary for 100 per cent kill; in one experiment with infested calamondin orange, two experiments with infested tangerine, and two experiments with infested sour orange, it was found that after 48 hours in sea water no larvae emerged from the fruits; in the one experiment with infested guava, 24 hours in sea water gave complete mortality. In every case where larvae came from fruits, a certain per cent of adults would emerge. More data are being collected in regard to other host fruits."

JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

Beetle population increasing.—Henry Fox, Moorestown, N. J., has compiled and summarized data on the number of adult Japanese beetles caught in a series of bait traps operated in the same places in the vicinity of Moorestown and Riverton since 1926 and reports: "The results indicate the beetle population of 1931 in the oldest infested area in the vicinity of Riverton and Moorestown as definitely greater than that of 1930—a result in conformity with conclusions drawn from data based upon a quantitative survey of the soil-inhabiting stages." On the relation of rainfall to beetle abundance, Mr. Fox notes that "the lowest catch was in 1930, the next lowest in 1931—results which might have been inferred from the data yielded by the larval surveys."

Work with *Tiphia vernalis* Roh.—J. W. Balock, Moorestown, summarizes the biological studies on this Japanese beetle parasite for the past year as follows: "Two shipments of females were received, totaling 5,718, of which 5,259 (91.9 per cent) were alive on arrival. Eleven colonies were started from this material, making the total number of colonies liberated to date 30. Fourteen out of the 19 colonies in the field prior to 1931 were scouted and 6 colonies were recovered. The colony showing the most promise was the one at Philmont, Pa. At this colony on May 18, 142 females were attracted and caught by using a 10 per cent honey-and-water solution over a period of 3 hours, from 10.30 a.m. to 1.30 p.m. * * * " He also states that "An experiment to determine whether *T. vernalis* is attracted to its host indicated that the females locate host grubs largely by chance, as the attraction of the host grub to the *Tiphia* is slight, if present at all."

Native *Tiphia* put to work.—M. H. Brunson, Moorestown, reports: "Twenty-four native females of *Tiphia* were collected and used in an attempt to ascertain if the native *Tiphia* common in the field during August would oviposit on Japanese beetle grubs and if the parasitized grubs would form cocoons, et cetera. Practically all of the *Tiphia* oviposited on the grubs. All eggs were placed on the dorsum. From the many parasitized grubs only one cocoon was obtained "

Thynnid reared in laboratory.-R. W. Burrell, Homebush, Australia, reports that "One of the most important developments of the month was the emergence on January 19 of the thynnid which was reared from egg to adult in the laboratory. As far as can be ascertained from the literature, this is the only complete rearing of a thynnid on record. It has been tentatively determined as Tmesothynnus zelebori Sauss."

Receipt of Australian parasites begins.-Reporting on the shipment by R. W. Burrell on January 18 of parasites of the Japanese beetle, T. R. Gardner, Moorestown, says. "The first shipment of Australian material arrived this month (February). The parasites are tachinids of the genus Palpostoma, which deposit their larvae on adults of several genera of scarabaeids. This shipment arrived in good condition on February 13 and consisted of one case containing 5,056 puparia. * * * The puparia were unpacked and transferred to sealed cages and placed in the refrigerator cellar for overwintering."

Collection of Palpostoma spp.-Mr. Burrell says: "Another 1,500 beetles were secured (in Australia). and 1,500 Palpostoma puparia were obtained from them. The total for the season was approximately 7,500 beetles collected, mainly Anoplognathus olivieri Dalm., from which the flies were secured. Field parasitism by Palpostoma spp. was lower this season than last. The parasitism was 16.1 per cent, with an average of 4 1/4 puparia per host. Parasitism by the ortalid Maenomanus ensifer Bezzi was also lower, being 2 per cent this season, as compared with 4 per cent last season. The Palpostoma work was brought to an enforced conclusion by the disappearance of the principal host from the field. A new host of Palpostoma recorded this year for the first time is Repsimus sp. (Rutelinae)." Of the Palpostoma spp. collected by Mr. Burrell, 68 per cent were P. subsessilis and 32 per cent P. testacea R.-D.

H. C. Hallock, Westbury, N. Y., reports that "The mean soil temperature was 6° lower during February than during January, 1932. This lower temperature has stopped the upward movement of grubs of the Asiatic beetle (Anomala orientalis Waterh.), as reported in the February Monthly Letter."

TRUCK CROP AND GARDEN INSECTS

Egg parasite identified.-L. W. Brannon, Norfolk, Va., reports that egg parasites, emerged on January 8 from eggs of the harlequin bug (Murgantia histrionica Hahn) collected in the cabbage field on January 5, "have been identified as Ooencyrtus johnsoni How. This same egg parasite was reared for the first time in this area in October, 1931, from harlequin bug eggs."

Why male earwigs leave home.- Reporting on biological investigations of the European earwig (Forficula auricularia L.), S. E. Crumb, Puyallup, Wash., says: "Oviposition has been noted since the middle of

February. Observations covering several years disclose some small details in the life history of the European earwig which apparently have never been recorded. A pair of earwigs normally occupy one cell in the fall and winter, but shortly before oviposition begins, the male leaves the cell--probably not entirely of his own accord. This accounts for the fact that, at the present time, about 94 per cent of the earwigs found above ground are males."

Effects of vapor treatments on the forcing qualities of narcissus bulbs.--Randall Latta, Sumner, Wash., says: "It is apparent * * * that the vapor treatment may be developed into a satisfactory measure for use with bulbs intended for forcing. * * * The indications are that the season of treatment should be during the month of August. * * * The temperature for forcing bulbs should not be higher than 112° F. if treatment is to last 4 hours or longer."

Biological note on Liothrips vaneeckei Priessner.--Ralph Scopp, Sumner, reports that "In life history work carried on in an incubator kept at 70° F. the following data have been obtained: Egg deposition to adult emergence required a minimum of 41 days; egg period for most eggs is 13, 14, and 15 days; pupal period, 18 days and longer; two molts are all that have been observed, the first occurring 9 days after hatching, the second 18 days after hatching, and shortly after the second molt the larva pupated. No prepupal stage was observed. One adult, an unfertilized female, emerged on January 3, was still living on February 29, and had laid 43 eggs, 11 of which had hatched."

Collecting leafhopper parasites.--Concerning methods of collecting parasitized beet leafhoppers, C. F. Henderson, Twin Falls, Idaho, reports: "The sweep method of collection was found inadequate for taking quantitative samples of leafhoppers in a life-history study of internal parasites such as Pipunculus sp. * * * When this method is used, even with fairly high temperature conditions, the percentage of parasitism is comparatively low and the average size of the parasites too small to represent a true picture of actual conditions. * * * When leafhoppers were collected individually with a vacuum apparatus, the opposite results were obtained, for the parasitized insects, being thus partially inactivated, are captured in larger proportionate numbers than are nonparasitized individuals."

Bean beetle dissemination proved rapid.--J. R. Douglass, engaged in investigations of bean insects at Estancia, N. Mex., reports as follows on experiments in the release and recovery of Mexican bean beetles: "The introduction of pyroxyline lacquers as a successful marker has constituted an important contribution to the studies of dissemination and flight of beetles. It has enabled the student to permanently mark 'hard shell' beetles. The selection of proper colors is no longer perplexing. * * * This test shows that beetles are able to migrate from the highest mountain pass in the Manzano Mountains to the lower edge of the western yellow

pine forest zone. It also shows that within 6 days beetles can infest fields 7 miles from the point of liberation. * * * In the fall when the beetles are on the wing seeking hibernation quarters the direction of their flight is greatly influenced, if not governed entirely, by the direction of the wind. The same is evidently true for their spring dissemination."

Lethal temperature for adult wireworm.—Reporting on the effect of high temperature on the sexes of the wireworm Pheletes californicus Mann., Roy E. Campbell and W. E. Stone, Alhambra, Calif., say: "Sixty per cent of a small lot of P. californicus males and 20 per cent of the females confined in outdoor oviposition cages succumbed when the soil surface temperature on February 27 reached and remained at 105° F. for one-half hour."

Temperature and wireworm growth.—C. E. Woodworth, Walla Walla, Wash., reports that experiments in weighing young larvae of the wireworm Pheletes canus Lec. kept at different temperature and in varying numbers (from 1 to 50) per can, have shown that 86° F. was sufficiently strenuous to prevent sufficient eggs from hatching to fill the "50" cans. The day-old larvae were moderately small as compared with the others but after a month had elapsed they were still quite small. They were, however, 5 1/2 times their day-old weight. The day-old figure may be a little in error, owing to small numbers available. All of the others show about a 10-times growth, reaching a maximum of 11 times at 73°. There is a slight falling off at 68°, being only 9 1/2 times, in spite of the fact that 37 days elapsed between weighings.

Light trap effective for mushroom flies.—A. C. Davis, Takoma Park, Md., reporting on studies of sciarid flies, says: "A light trap similar to the one described by Herms and Burgess (Electrical West. 60: 204-205, Apr., 1928) has given surprisingly good results so far. In one heavily infested mushroom house at Capital Heights, Md., 65.93 grams, or 187,142 flies, were caught in a 24-hour period. * * * of these 74.91 per cent, or 140,207, were females, of which approximately 55.26 per cent were gravid. It is the habit of these flies, when caught or otherwise in trouble, to deposit all of their eggs in a mass. There were thousands of eggs so laid in the bag of the trap, so that the percentage of females gravid at the time they entered the trap would probably be around 70; 9.82 per cent of the females were newly emerged, and probably never had laid eggs. There were also in this catch approximately 10,680 phorid flies, 28.29 per cent (303.27) males and 71.60 per cent (746.75) females, of which 32.75 per cent were gravid."

FOREST INSECTS

Spray for spruce budworm.—The data secured by B. H. Wilford on the control of Harmoloba fumiferana Clem. in Cody Canyon, Wyo., have been sum-

marized by J. C. Evenden and A. L. Gibson, of the Coeur d'Alene, Idaho, laboratory. Mr. Evenden says: "During this operation a number of different sprays were tested * * * Owing to the habit which the budworm larvae have of feeding at the base of the new needles, the insect has proved a difficult pest to reach with a spray. Furthermore, it was very difficult to secure a good coverage of the new needles, though a number of spreaders and stickers were used. * * * Of all of the different stomach poisons tested, lead arsenate and fish oil seemed to give the best results when applied to the trees when the buds had just opened."

Parasitism on the Douglas fir beetle.-W. D. Bedard, Coeur d'Alene, reporting on the biology of Dendroctonus pseudotsugae Hopk., says: "One of the interesting features of this report is the percentage of the Douglas fir beetle broods parasitized by Coeloides brunneri Vier. * * * an average of 29 per cent of the bark-beetle larvae were destroyed by this insect, and an additional 20 per cent destroyed by other less important parasites. * * * the parent adult beetles emerge from the first tree attacked and make another attack upon a different tree, thus increasing the potential increase that can be expected from overwintering broods."

Fatal temperature for mountain pine beetle.-Relative to the effectiveness of the burning-standing method of control being practiced against Dendroctonus monticolae Hopk., T. T. Terrell, Coeur d'Alene, conducted a series of tests "to determine the degree of heat necessary to destroy both mountain pine beetle and Douglas fir beetle larvae. As a result of these tests it was found that an exposure of 4 to 6 minutes at 114° resulted in 100 per cent mortality. However, a sustained exposure of 30 minutes at 110° resulted in only 20 per cent mortality of both these two species of larvae."

Effect of slash on bark-beetle abundance.-J. A. Beal, Portland, Oreg., reporting on the effect of ponderosa pine slash on insect abundance, says: "The results of the study show that the western pine beetle does not ordinarily find suitable breeding conditions in the slash to which it is attracted. In only rare cases is it found producing good broods under conditions occurring in logging slash. In windthrown trees development of this insect was found to be more successful. The increase was about half that obtained from standing infested trees but both attack and emergence were below normal. The Oregon pine engraver beetle was by far the most abundant insect studied, and it increased very rapidly under protected conditions. In shaded material, such as limby tops and brush piles, it reproduced itself six times as abundantly as in material exposed to the sun. This insect also emerged in large numbers from young standing trees to which it was attracted. Exposure more than any other single factor appeared to influence the number of slash insects. High subcortical temperatures of exposed slash were found to be important in keeping down the number of slash insects throughout the region studied. These temperatures were governed chiefly by sunshine intensity, angle of

exposure, bark thickness, and temperature and movement of the air. No marked differences in the effect of ponderosa pine slash on insect abundance were found in different parts of the region studied. Fatal subcortical temperatures occurred in favorably exposed slash in northern Washington, as well as in southern Oregon. Methods of slash disposal which expose the maximum of slash material and avoid shading either through piling or otherwise are sound from an entomological standpoint. The best known method of keeping down the number of slash insects is in full accord with the latest recommendations for slash disposal from the standpoint of protection from fire."

Forest insect handbook soon to be issued.--F. P. Keen, Portland, Oreg., reports that his "manuscript for a forest insect handbook for use of the field men of the Forest Service in Region 6 was completed during the month in cooperation with J. Jaenicke, of the Forest Service. Only those insects of major importance in this region are considered, but these are described in full and each one illustrated with a full page plate. Methods of detecting outbreaks, and of reporting upon outbreaks and control methods, are discussed in full, and instructions given in regard to necessary reports by rangers on forest insect activities. This field manual will be mimeographed and distributed to the forest officers as a supplement to the Forest Management Handbook."

Temperature and development of Scolytus ventralis.--G. R. Struble, according to J. M. Miller, Berkeley, Calif., "has completed a report covering the 1931 life-history studies of the fir engraver beetle, in which a number of new and valuable points are presented. It has been determined that activity and brood development occur between the temperatures of 55° and 99° F., that maximum development occurs between 70° and 85°, and that the number of seasonal generations is dependent upon sustained bark temperatures within this range."

CEREAL AND FORAGE INSECTS

Fermenting molasses attracts Pyrausta nubilalis.--"Information concerning the relative attractiveness of several fermented baits to the European corn borer moth was obtained during the August flight period of 1931 at the U. S. D. A. Farm in Berkeley, Mass.," according to C. H. Batchelder and D. D. Questel. "This included 5 per cent to 25 per cent solutions of various sugars fermented during one to three days before field tests. The fermented preparation included raw cane sugar, blackstrap, low remelt sugar, medium grade molasses, corn dextrin, and malt, corn, and banana sirups. The trap catches obtained through the use of these materials indicate that attractiveness is dependent as much upon the process of fermentation as upon the source of the sugar sirup. Several experiments led to this general conclusion. * * * The data show that medium grade molasses is slightly less attractive than malt and consistently more effective than either black strap or low remelt sugar. The conclusion is drawn that

since the catch increases with the suitability of the media for yeast development, the value of the solution as a bait depends very considerably upon the rate of its fermentation."

Oriental parasites of corn borer shipped.-C. A. Clark reports from Kobe, Japan, that "Shipments of overwintering larvae (of parasites of the European corn borer) during January totaled 240,000 * * * The tachinid Ceromasia lepida Meig. and the ichneumonid Cremastus hymeniae Vier. should be obtained in numbers from these larvae. Kokubu section, in Kagoshima Ken, Kyushu Island, Japan, is a new section for large-scale collections. Larvae from this area will give the very desirable parasite C. hymeniae in much larger numbers than we have ever been able to secure before. Over 100 fairly well-trained collectors are now available here and collections average 8,000 to 10,000 larvae per day. Kokubu section is about 15 miles from Kagoshima (City) and consists of a narrow valley about 10 miles long, with Kokubu as the principal town."

Sorghum midge and corn earworm emerge early.-E. V. Walter and Lee Seaton, San Antonio, Tex., report their observations on Contarinia sorghicola Coq.: "The excessively warm, damp weather has apparently been quite favorable to the midge so far. One adult female emerged in our emergence cage on February 20. On the same day Johnson grass was found in bloom. This is our earliest record of emergence and also of blooming Johnson grass. Part of a plot of grain sorghum was cut and bound in bundles and placed in a shock last November. The remainder of the plot was left standing to get a comparison of the overwintering of the midge and parasites in the two treatments. One hundred apparently infested spikelets were taken from each of 10 heads from each source on February 10, thus giving 1,000 spikelets from each source. These were dissected by Mr. Seaton * * * it seems that there was practically no difference in the ability of the midge or its parasites to successfully pass the winter in either of these treatments when the winter is as mild as the present one has been." George W. Barber, of the Savannah, Ga., sublaboratory, states that "On February 19 a corn earworm moth (Heliothis obsoleta Fab.) emerged from hibernation, the larva having entered the soil between August 20 and 24, 1931. No other emergence from hibernation has been observed. In 1931 the earliest emerging moth was recorded on May 1."

New joint worm has three generations.-F. F. Dicke, engaged in joint-worm investigations at Charlottesville, Va., reports that "A new species of Harmolita was found infesting Reed canary grass (Phalaris arundinacea L.) at Fairfield, Va. Observations on the life cycle of the species during the past year revealed three complete generations. This is the first species of Harmolita on record having more than two generations annually. It was heavily parasitized by Syntomaspis lazulella Ashm. and moderately by Eupelmus allynii (French) and a species of Merisus."

Parasites of the green clover weevil.-Reporting on parasites of Phytonomus (Hypera) nigrirostris Fab., Max M. Reeher, Forest Grove, Oreg.,

says: "Our material of the parasites of P. nigrirostris was worked over and the more rarely occurring species of Microbracon were determined by C. F. W. Muesebeck as M. hyslopi Vier. and M. tychii Mues. The very small numbers of these species that have been reared from P. nigrirostris indicate that these are normally parasites of other insects * * * M. tenuiceps Mues. has been reared in such large numbers that there is no doubt that this is now the most important enemy of P. nigrirostris in this region. Bathyplectes exigua Grav. has been a close rival and in the early days of the occurrence of P. nigrirostris in the Pacific Northwest it was the most important parasite. Dibrachoides dynastes Förster, while now widely distributed in this region, normally takes only a small toll of the host; however, our rearings indicate that this species, in some years, may be abundant in some localities."